

Structure and Stratigraphy of the Parautochthonous Zone of the Taconian Appalachians in the Québec City Area

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During the final convergence phase of the Middle to Late Ordovician Taconian orogeny, the Laurentian margin was flexed downwards under the weight of the approaching orogenic wedge leading to the development of a foreland basin. Deformation progressively migrated northwestward and eventually reached the southeastern edge of the foreland basin, folding and imbricating these strata and forming the Québec Appalachian parautochthonous zone.

Disruption, imbrication and thrusting of the foreland basin sequence are responsible for the development of chaotic units within the flysch sequence, that have been distinguished on the basis of processes involved during their development: (1) Olistostromes: sedimentary bodies emplaced by debris flows or avalanches, composed of variably sized blocks, almost exclusively derived from the foreland basin; (2) Tectonosomes: strongly deformed and tectonized foreland basin units in fault zones or along fold limbs. Contrary to what had been previously suggested, we found no lithological, stratigraphic nor structural evidence for the derivation of olistoliths from Cambrian strata of the Chaudière Nappe, presently exposed immediately south of the parautochthonous zone.

Structurally, the parautochthonous zone consists of a series of steep, southeast-dipping thrust faults that display an imbricate thrust fan geometry. Deformation within the zone features N20 and N70 oriented folds. Chronological relationships suggest two distinct deformation stages: a first stage related to the imbrication of the foreland basin and emplacement of the most external allochthons followed by late-stage out-of-sequence thrusting of the Chaudière Nappe over the previously imbricated parautochthonous zone and transported external allochthons.